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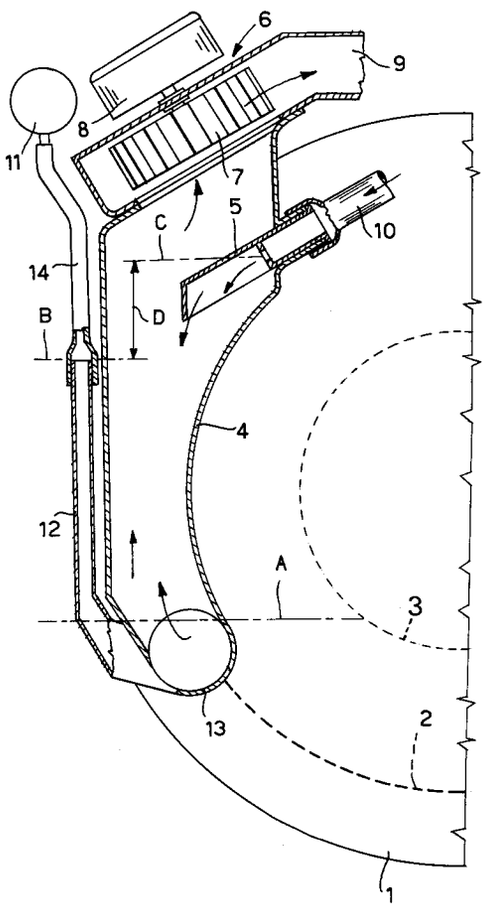
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(54) Safety device against water pollution for the drying circuit of a washing and drying machine.

(57) The washing and drying machine includes in a manner known in itself a washing container (1), a rotating laundry drum (2) rotatably housed in said container (1) and a steam condenser (4) communicating with the inside of said container (1) to receive the steam emanated by the washed laundry contained in the drum (2) and housing a nozzle (5) for spraying cold water for the condensation of the abovementioned steam. In order to ensure a desired anti-pollution safety in the drying step as well, there is a pressure switch (11) connected to the steam condenser (4) and calibrated so as to determine the interruption of the supply of water to the spraying nozzle (5) when a level of water is detected in the container that is higher than a predetermined level (B) but lower than the level of supply (C) of said spraying nozzle (5).



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The present invention relates to a safety device against water pollution for the drying circuit of a washing and drying machine.

A washing and drying machine is well-known to include the two functions of washing and drying of clothes.

Already in normal washing machines the need has asserted itself for some time, and in several Countries it has become mandatory, to provide the water inlet circuit with means for preventing the return of the water, already mixed with detergents, into the mains water supply, for example, after a partial or total blockage of the machine's discharge conduit.

For this purpose, in particular, between the inlet of washing water and the highest level that can be reached by the detergents inside the holder, there has to be a so-called "air-gap", generally set at 20 mm or more.

The problem becomes complicated in the case of washing and drying machines, wherein the steam condenser requires an additional inlet for the supply of cold water, for which the use of the "air-gap" system becomes difficult. The level at which the cold jet is inserted into the steam condenser is in actual fact always below the level of overflow used in the detergent loading circuit for the washing cycle, so that it is necessary to add a further overflow outlet positioned so as to prevent the elimination of the "air-gap" provided for supplying the steam condenser.

The object of the present invention is to accomplish an improved safety device against water pollution that can operate effectively and at low cost on the drying circuit of a washing and drying machine, in particular on the supply of cold water destined for the steam condenser.

According to the invention such object is attained with a safety device for the drying circuit of a washing and drying machine comprising a washing container with a rotating laundry drum and a steam condenser communicating with the inside of said container to receive the steam emanated by the washed laundry contained in the drum and housing a nozzle for spraying cold water for the condensation of the abovementioned steam, characterized in that it comprises a pressure switch connected to the steam condenser and calibrated so as to determine the interruption of the supply of water to the spraying nozzle when a level of water is detected in the container that is higher than a predetermined level but lower than the level of supply of said spraying nozzle.

There is thus avoided in a very simple and functional manner any return of water in the conduit supplying water for the condensation of steam with the corresponding polluting effects of the water mains.

These and other features of the present invention shall be evident from the following detailed description of one of its embodiments illustrated as a non-limiting example in the only figure of the enclosed drawings, that represents diagramatically, with sectioned parts, the rear part of a washing and drying machine accomplished according to the present invention.

There is indicated in the drawing with 1 a conventional washing container for a washing and drying machine, inside which there is rotatably arranged a rotating laundry drum 2 accessible from the outside through a port 3.

All the parts relating to the loading of washing water inside the container 1 have not been shown since they are not related to the claimed invention.

But the drying part is indeed shown, and it comprises a steam condenser 4 constituted by a wide vertical conduit that communicates at its lower end with the inside of the washing container 1 so as to receive the water vapour released by the washed laundry contained in the drum 2 and receives at a height that is selected in an appropriate manner in relation to the level A of the water in the container 1 a nozzle 5 for spraying cold water destined to cause the condensation of the steam in the condenser 4. At the upper end of the condenser 4 there is an aspirator 6, constituted by a fan 7 and by a motor 8, that has the task of aspirating the steam to be condensed from the container 1 and that condensed downstream from the nozzle 5 and to send it through a conveyor 9 to a drying area (not shown), where an electrical resistance dries the condensed steam and correspondingly forms a flow of dry hot air that is lastly returned to the container 1 through a recirculation conduit (also not shown).

For the supply of cold water to the spraying nozzle, the latter, through a flexible hose 10, is connected to a cold-water mains supply suitably controlled by a solenoid valve that is separate from that used to load the washing water.

In order to avoid a possible return of polluted water into the water mains through the abovementioned cold-water supply, say following the defective operation of the discharge of the container 1, there is a pressure switch 11, that through a narrow vertical bypass 12 of the inlet mouth 13 of the steam condenser 4 and a flexible extension 14 detects the level of the water in the container 1 and electrically drives the interruption of the supply of cold water to the nozzle 5 should the detected level reach a predetermined level B higher than the normal washing level A but in any case at a suitable safety distance D from the level C at which the nozzle 5 is supplied.

The dimensions of the bypass 12 are selected so as to avoid any possible clogging up with lint

and such like during the drying operation and to make it easy for water to flow back and forth during the washing cycle.

Between the spraying nozzle 5 and the maximum allowable level B there is thus guaranteed a suitable "air-gap", that can be set at at least 20 mm.

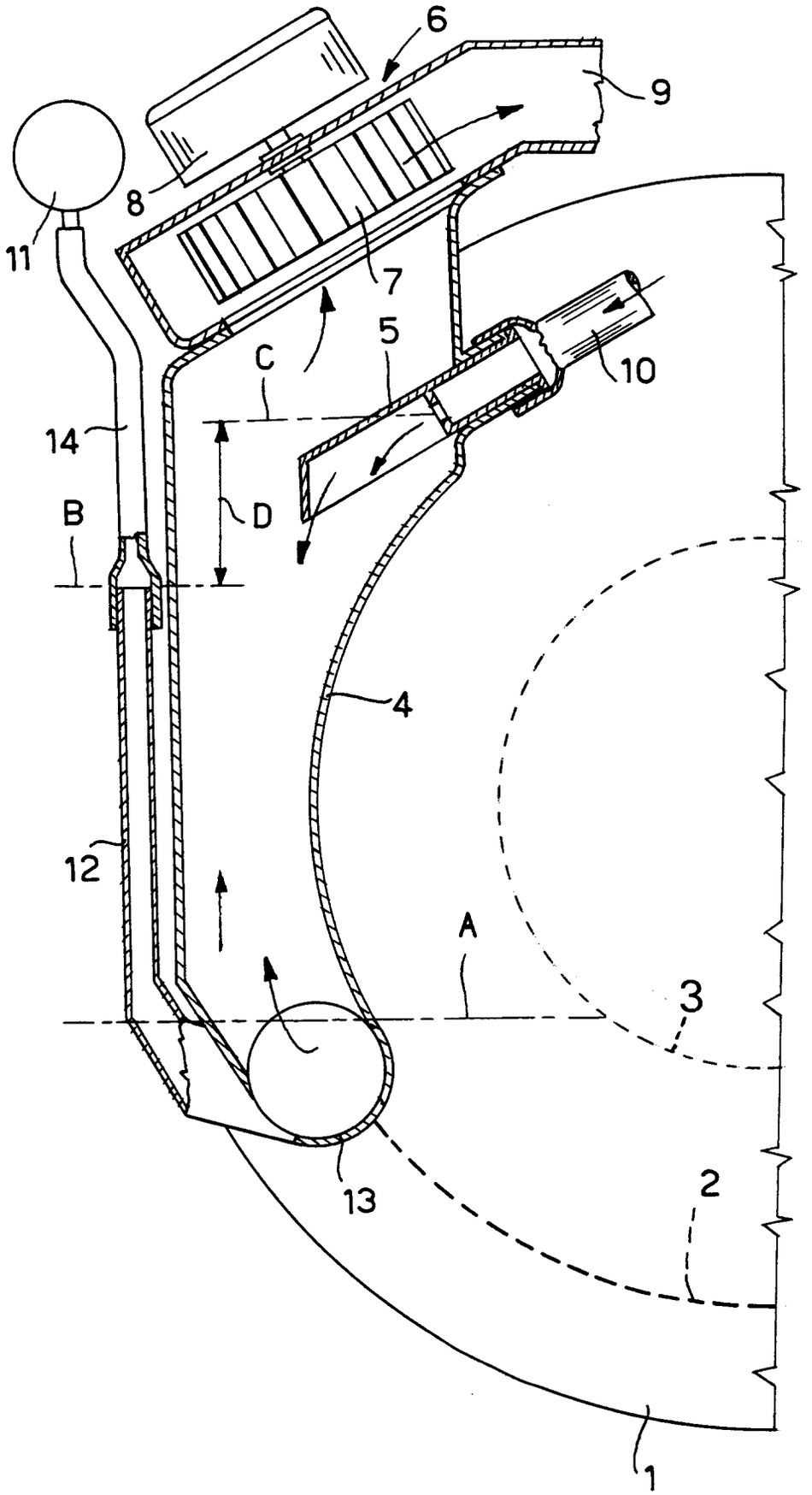
It is also possible to mount a twin pressure switch for the control of other functions, for example to activate the washing machine's discharge pump also protecting a possible breakdown condition of the loading valve at opening or for controlling the level of water for covering the heating resistance, preventing its dry operation.

Claims

1. Safety device for a drying circuit of a washing and drying machine comprising a washing container (1) with a rotating laundry drum (2) and a steam condenser (4) communicating with the inside of said container (1) to receive the steam emanated by the washed laundry contained in the drum (2) and housing a nozzle (5) for spraying cold water for the condensation of the abovementioned steam, characterized in that it comprises a pressure switch (11) connected to the steam condenser (4) and calibrated so as to determine the interruption of the supply of water to the spraying nozzle (5) when a level of water is detected in the container that is higher than a predetermined level (B) but lower than the level (C) of supply of said spraying nozzle (5).

2. Safety device according to claim 1, characterized in that the distance between said predetermined level (B) and said supply level (C) is of at least 20 mm.

3. Safety device according to claim 1, characterized in that said pressure switch (11) is connected to a narrow vertical bypass (12) of the steam condenser (4).


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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 0130

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-U-8 902 051 (INDUSTRIE ZANUSSI S.P.A.) * page 4, line 34 - page 5; figure * ---	1,2	D06F25/00 D06F58/24
A	FR-A-2 623 531 (INDUSTRIE CANDY S.P.A.) * claims 9,10; figures * -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	03 MAY 1993	COURRIER G.L.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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